J-PARC Program Advisory Committee for the Nuclear and Particle Physics Experiments at the J-PARC Main Ring v1.4.2

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KEK/J-PARC-PAC 2024-XX
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Minutes of the 38th meeting held on
30 July (Tue.) – 1 August (Thu.), 2024

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Present:

P. Achenbach (JLab), M. Aoki (Kanazawa), M. Endo (KEK), L. Fabbietti (Munich), H. Ishino (Okayama), K. Joo (Connecticut), G. Karagiori (Columbia), T. Kawabata (Osaka), C. Lazzeroni (Birmingham), H. Lenske (Giessen), K.B. Luk (Berkeley), K. Miyabayashi (Nara), H. Ohnishi (Tohoku), M. Oka (JAEA), X. Qian (BNL), K. Sekiguchi (Tokyo Inst. of Tech.), J. Stroth (Goethe), Y. Yamazaki (Kobe), K. Yorita (Waseda), T. Yamanaka (Chair, KEK),
N. Saito (KEK-IPNS Director), T. Komatsubara (KEK-IPNS Deputy Director) and T. Kobayashi (J-PARC Director)

3 Procedual Report

The minutes of the 37th J-PARC-PAC meeting (KEK/J-PARC-PAC 2024-5) were approved.

4 Laboratory Report

4.1 Welcome and J-PARC Center Report (Takashi Kobayashi, J-PARC Center Director)

The J-PARC Director, Takashi Kobayashi, gave a welcome note, and presented a J-PARC Center report. He introduced J-PARC and its new organization. He finished his three-year term and was appointed for another three-year term starting this April. The deputy directors are Miyamoto (on safety), Kinsho (in connection with JAEA), and Komatsubara (in connection with KEK). After a quick overview of J-PARC facilities and experiments, Kobayashi announced a recent achievement of MLF, i.e. stable operation at the world's highest beam power of 1 MW, which is the design power. He also announced that the J-PARC MR achieved stable operation at a beam power of 800 kW, exceeding the design power of 750kW that was already achieved last December.

Kobayashi apologized for the two fire incidents occurred in JFY 2023, one at MR D2 on April 25 and the other at HD on June 22. After the investigation of the cause and the implementation of countermeasures, HD resumed its operation in April 2024, nine months after the fire. He also explained that the one-week earlier shutdown of MLF before the summer maintenance period was caused by a problem in the neutron source: an increase in the amount of moisture in the helium vessel that surrounds the neutron source was detected, indicating a malfunction somewhere in the vessel. Beam operation had to be stopped, and the investigation is underway. Depending on the cause, this could impact on the schedule of operation after the summer shutdown.

He also explained two MR troubles that occurred in JFY 2024. The first was a shortcircuit between layers of an MR bending magnet coil on May 5, 2024. Two weeks were needed to restart the beam operation after replacing the magnet coil, affecting the HD beam time. The other one was a cooling power shortage caused by a breakdown of a cooling tower fan, in addition to the three already-broken fans out of sixteen at that time. This resulted in a 9-day reduction in NU operations.

During the summer shutdown, scorched components in a chiller in the Linac building were found, and the fire department assessed that it was a fire incident. The investigation is underway, and countermeasures will be implemented. Regulations require that a written report including preventive measures should be officially accepted by the local governments. J-PARC aims to complete this process well before scheduled beam operation resume from November 21, but if it takes longer, the start of the beam time might be delayed.

Kobayashi explained two major issues of J-PARC concerning its mission of long and stable operation of the facility. One is the dramatic increase in electricity cost from 8 yen/kWh in 2010 to 20 yen/kWh. The other is the aging of components. The HD facility had power supplies of more than 40 years old, and many power supplies of $\sim$30 years old. The components at other facilities are starting to exceed 20 years old, affecting stable operation. J-PARC is planning to replace those old components.

Kobayashi also explained about the approved budget for JFY 2024. JAEA operates Linac, RCS, and MLF in upstream, while KEK operates MR, NU, and HD. in downstream. The JAEA and KEK budgets cannot be mixed, giving constraints on operation. JAEA's operation budget is 101.8 oku-yen[1], the same as in 2023, which enables operation of the upstream part for 7.2 cycles[2]. KEK's operation budget is 53.08 oku-yen, the same as in 2023. KEK aims at 7.2 cycle operation of the downstream part by rearranging KEK internal budget. He also explained the budget for $g-2$ experiment, aging countermeasures, Hyper-Kamiokande (HyperK), and others.

Kobayashi also explained that the annual operation pattern of J-PARC may change in the future. The summer maintenance period is getting longer because of the increasing radio-activation in the MLF neutron source. It is currently 4.7 months. J-PARC is working to shorten this maintenance period by replacing the MLF target with an upgraded one that only need a replacement every two years. He stressed that the total running period depends on budget.

Kobayashi introduced some future projects at J-PARC. Target station-2 at MLF will be constructed. The extension of the Hadron Experimantal Facility received the highest priority in PIP2022 of KEK and the design is under discussion for cost reduction. The construction of HyperK started in 2020 and is on-going, aiming to start operation in 2027. He advertised the J-PARC Symposium 2024 in October. The symposium discusses scientific achievements in the last 15 years, and future projects for the next 20-30 years and beyond.

Kobayashi explained the status of the direct access road to the J-PARC site. The construction started in JFY 2024, and radiation monitoring posts will be relocated. Budget for its construction in JFY 2025 and JFY 2026 was requested to MEXT.

4.2 J-PARC Accelerator Status (Yoichi Sato, J-PARC/KEK)

Yoichi Sato from the Accelerator group reported the J-PARC accelerator status and plan. He explained the recent Main Ring (MR) upgrade to achieve a higher repetition rate which is mandatory to achieve higher beam power; they upgraded the main magnet power supplies, the RF system, the injection and fast extraction system as well as the collimator system, resulting in realizing a repetition cycle of 1.36 sec in FX and 4.24 sec in SX. With these upgrades they succeeded in providing more than 800-kW beam for the neutrino facility (NU), and they are planning 900-kW tests in JFY 2024. The upgrade also enabled them to achieve 80-kW SX operation with higher extraction efficiency of 99.6%. Newly installed beam diffusers in the extraction section helped to improve the extraction efficiency. They will continue optimizing the diffuser configuration to suppress the beam loss around the extraction devices. The spill structure after the upgrade was improved by tuning (the duty factor increased from 61% to 72%), but it is still worse than

[1] "oku" = 10^8

[2] 1 cycle = 22 days of beam time

the structure before the upgrade (78% duty factor).

Sato presented their plan toward a 1.3-MW operation in FX by JFY 2028. This includes RF system upgrade, installation of more magnet power supplies for beam correction, strengthening the power supply system of main magnets as well as upgrading the abort dump capacity. All of these are indispensable for realizing the 1.3-MW goal.

At the end of his presentation, Sato summarized troubles related to the J-PARC accelerator facility. In May 2024, a shortcircuit between layers occurred in a coil of a bending magnet, which was fixed by replacing the magnet with a spare. In June 2024, broken fan motors in one of the cooling towers used for magnet cooling was found. The beam operation before summer had to be stopped earlier due to this problem, resulting in 9 days of loss of the NU user machine time. The replacement work is in preparation. In July 2024, scorched components in the LINAC building was found. Detailed investigation is in progress along with countermeasures against the aging of the facility components.

4.3 Welcome and Mandate to the Committee (Naohito SAITO, KEK IPNS director)

The director of the Institute of Particle and Nuclear Studies (IPNS) of KEK, Naohito Saito, welcomed the PAC members.

Saito first introduced the organization structure of IPNS which covers a wide range of scientific researches. Instrumentation Technology Development Center (iTDC) under IPNS is working to develop cutting edge technologies for Inter-University researches and relevant research communities. The current status of IPNS projects was then presented. He stated that a hadron test beam line at Hadron Experimental Facility is under consideration as an activity of iTDC. Radiation calculations and simulation studies of particle species, momentum, and yield are being evaluated based on a collaborative effort between iTDC and the Hadron group of IPNS.

A timeline of various ongoing and future large-scale projects was shown. Saito explained that the extension of Hadron Experimental Facility (HD) has the top priority in the Project Implementation Plan made in 2022 (PIP2022), and realistic design optimization to reduce the total cost is underway for a budget approval. Status of various task force meetings for those projects was presented. A taskforce to improve robustness of facilities has been recently launched, which is chaired by Junji Haba (KEK). A review committee for COMET Phase-I was formed under J-PARC PAC, chaired by Augusto Ceccuci (CERN), and the meeting was held on July 26th, 2024 to review scientific significance, soundness of technical aspect, management and leadership in the collaboration.

Mid-term perspectives of beam time was presented. Although the electricity price is decreasing, there is still an issue on recent high exchange rates. IPNS is working to secure more beam time in this fiscal year. Facility troubles in J-PARC accelerator and beam lines due to aging have been an urgent issue to be solved.

A taskforce was set to improve facility resiliency. There are many requests for beam time from experimental groups, thus beam time allocation must be carefully considered to efficiently supply fast-extracted, slow-extracted, and bunched slow-extracted beams, which require exclusive beam time.

Saito introduced new PAC members participating in this meeting.

New documents submitted to this PAC meeting were summarized; reports from E75 and P100; one addendum from P95; two new proposals regarding a test experiment (P103) and an experiment (P104) at HD; one revised proposal by P100; and two Letters of Intent regarding experiments at HD. One Technical Design Report (TDR) for Stage-2 request was submitted by E80, and thus Facilities Impact and Financial Committee (FIFC) meeting was held to review the TDR.

Saito requested the PAC to evaluate proposals along with requests for Stage-1 status and Stage-2 approval to provide recommendations to the IPNS and J-PARC directors. He also requested to assess the progress in the ongoing experiments as well as any advice on the run plan in this fiscal year.

4.4 Hadron Facility Status and Plan (Hitoshi Takahashi, J-PARC/KEK)

Hitoshi Takahashi gave the status and plan of the Hadron Experimental Facility (HD). He started his talk by introducing HD beam lines, A-, B-, and C-lines, as well as their operation patterns at HD. He then summarized the beam time from April to June, 2024. Although the available user time was limited to only 41% of the plan due to machine downtime, the beam power reached 82 kW, which is a great achievement. The facility inspection was conducted on June 3, and E16 Run0 at the B-line was completed. Unfortunately, the data collection for E73 at K1.8BR was not completed. Additionally, a power supply for the beam line spectrometer at K1.8 was unstable, and the E70 experiment at K1.8 was unable to complete beam commissioning.

Takahashi then introduced two recent activities in HD. The first activity is on the test beam line. Test beam lines of hadrons are highly anticipated and currently very limited worldwide. J-PARC HD group and iTDC are discussing to construct a new test beam line in the HD hall. A pipe had been buried inside the concrete wall of the primary beam line, allowing secondary particles from the T1 target to penetrate and be monitored. A plan to modify the K1.8BR area for the E80 experiment would create space around the buried pipe exit, enabling the construction of a test beam area utilizing the pipe. The maximum momentum will be 1.0 GeV/c. He explained the expected intensity using the Sanford-Wang formula; when the slit is fully open, the π^- intensity will be 1.6×10^6/spill at 0.5 GeV/c and 4.6×10^5/spill at 1.0 GeV/c. However, a recent MARS simulation predicted two orders of magnitude less intensity due to the vacuum chamber wall made of thick stainless steel that the beam has to go through. Even with this reduction, the intensity is still high enough for test experiments. The HD group is discussing to install additional beam monitors to estimate the yield more precisely.

The second activity is the R&D of a new production target. The current production target is made of gold with a copper base, and water-cooled through the copper (indirectly cooled). It can accept 95 kW of beam at a 5.2-s cycle, and 115 kW at a 4.24-s cycle. The beam power that accelerator provided reached 82 kW so far, foreseeing more beam power in the next few years. The R&D of a next-generation rotating target that can accept more than 150 kW is ongoing. The target rotates to spread the heat load within the ring and can be directly cooled by He-gas or water. The rotating disk has a nickel/copper base with gold/platinum/tungsten edge, resembling a Euro-coin. In JFY 2023, the rotation system of the dummy disk had already been established. The inner part of the disk was made of pure copper, but the outer part was made of Tungsten alloy to save cost, with the original design of gold edge in mind. The disk demonstrated successful machining of the copper fin. Bonding between gold and copper was already achieved in the current target. Thus, key fabrication techniques have already been established. The lifetime of the target is limited by the bearing; two years with a normal bearing. A gas bearing is being developed to extend the lifetime to more than five years.

Currently, another option of making an entire target disk with Tungsten is being studied. The original plan of using a gold/platinum edge as a target is a costly option compared to a tungsten target. If tungsten is used as a target, the bonding strength between tungsten and the inner material is not sufficient for operation. Thus, the fabrication of the whole-tungsten disk and its rotation was tested. At first, the whole-pure-Tungsten disk was developed. It had two difficulties. One is that the machining is difficult because it is very hard material. The other is the limitation of the commercially available size of Tungsten plates, which requires the bonding of materials. Hot Isostatic Pressing (HIP) bonding was used to make a 84-mm-thick tungsten single disk from seven pure tungsten disks, each with a thickness of 12 mm and a diameter of 350 mm. A color check revealed no crack. Machining to make the fin was also successful; no defect was found on the surface. Surface dirt (oxide later) will be chemically removed in 2025. After that, the outer surface will be black-coated by ion plating to increase emissivity. Rotation test with the whole-pure-tungsten was also successful at 500 rpm, although it is heavier than the dummy disk made of copper and tungsten by 7 kg. A long-term ($\sim$1000 hours) stability test of rotation will start in 2024.

5 Evaluations of the Proposals and Status of the Ongoing Experiment

5.1 P103 (DAQ test for E50)

Approved as a test experiment

P103 was proposed as a test experiment to evaluate the performance of the streaming-readout DAQ system for E50. It was approved as a test experiment, T103, after being evaluated by the PAC chair, FIFC chair, and the head of J-PARC

Particle & Nuclear Physics Division. T103 was conducted before the summer.

5.2 E16 (Vector meson in nuclei)

The E16 experiment aims to measure the spectral change of ϕ mesons produced in nuclear matter by using proton-induced reactions off several targets (C, Cu, Pb) and by measuring the e^+e^- decay of the vector meson. The comparison of the spectral function obtained on different targets should deliver evidence for the in-medium modification of the vector meson properties that can be linked to chiral symmetry restoration. The E16 collaboration carried out five test runs (Run0) using up to 1/3 of the total set up and they successfully commissioned the detector systems. PAC congratulates the collaboration for the efficient commissioning of the experimental set-up. During these tests, the collaboration had encountered problems due to microspill structures with two different frequencies that limited the DAQ live time for the experiment. Major efforts have been made from the accelerator team to reduce the microspill effects since 2021, and in parallel to that, the collaboration has reduced the dead time for the experiment by buffering the GEM-detector data. The PAC congratulates the collaboration for this effort that demonstrated the live time of 82% during the 2024 test, and considers that the experiment is ready for physics run.

The PAC supports further improvement of the microspill structure from the accelerator side to improve the performance of E16.

The PAC also wishes to see plots that demonstrate the efficiency of the e^+e^- trigger and the quality of the ϕ and ω invariant mass reconstruction, and the projection of the total statistics expected from Run-1 at the next meeting before the physics data-taking period is approved.

5.3 E70 (Cascade hypernuclei)

The E70 experiment aims to conduct the spectroscopy of ${}^{12}_{\Xi}\mathrm{Be}$ hypernuclei using the ${}^{12}\mathrm{C}(K^-, K^+)$ reaction to examine the ΞN interactions. E70 will target a missing-mass resolution of 2 MeV/c^2 FWHM, significantly surpassing any previous experiments, by using the S-2S spectrometer and an active fiber target (AFT) at the K1.8 beam line. The high-statistics data sample with unprecedented mass resolution is expected to reveal the nature of the bound states of Ξ^- in the ${}^{12}_{\Xi^-}\mathrm{Be}$ (${}^{11}\mathrm{B} + \Xi^-$) system, and $\Lambda\Lambda$ in the ${}^{12}_{\Lambda\Lambda}\mathrm{Be}$ (${}^{10}\mathrm{Be} + \Lambda\Lambda$) system.

The PAC congratulates the E70 team for achieving a missing mass resolution of 4 MeV/c^2, twice as good as that obtained in the previous E05 experiment. Though the team was unable to complete beam commissioning due to an unstable power supply for the beam line spectrometer, the team successfully collected 882 $p(K^-, K^+)\Xi^-$ events over four days of beam time, and demonstrated that the tracking and particle identification system work as expected. The PAC acknowledges the team's effort to improve the resolution to the goal of 2 MeV/c^2 and looks forward to hearing about their progress at the next meeting.

The PAC recommends keeping the high priority to the E70 project for the beam time at K1.8. The team requests 3 + 7 days for commissioning and calibration, followed by 20 days (80 kW) for the physics run after the summer shutdown with the current setup. The E70 collaboration presented that even with the currently achieved missing mass resolution of 4 MeV/c^2, the team can distinguish between the two hypotheses of the missing mass distribution, i.e., one with two Gaussian peaks and one without any peak, inferred by E05. The PAC strongly recommends the team to achieve the 2-MeV/c^2 mass resolution in order to have a better distinction between the two hypotheses. The PAC also endorses an additional one-day beam time for a dedicated calibration run for E96.

5.4 E75 (Formation cross-section of cascade hypernuclei)

E75 aims to measure the formation cross-section of ${}^{7}_{\Xi}\mathrm{H}$ in the ${}^{7}\mathrm{Li}(K^-, K^+)$ reaction with the final goal of decay pion spectroscopy of ΛΛH produced by Ξ-hypernuclear decay. The original plan of the experiment is to use an enriched ${}^{7}\mathrm{Li}$ target. However, due to the soaring price of enriched ${}^{7}\mathrm{Li}$, the proponents changed the plan to use a ${}^{\mathrm{nat}}\mathrm{Li}$ target and an enriched ${}^{6}\mathrm{Li}$ target with the same thickness.

In this PAC meeting, E75 reported the expected energy spectra based on the two different theoretical calculations, showing the feasibility of the measurement. Due to the change of the targets, E75 revised the requested beam time from 7 days to 9 days in case E75 is arranged in the same series as E70. If E75 is to be performed independently from E70, it will take additional 5 days for commissioning the detection system.

The PAC finds that E75 addresses well the concerns raised by the last PAC meeting and supports the revised plan for the target proposed by E75. The PAC also expects that the E75 is scheduled after the E70 experiment in an efficient manner.

5.5 E63 (Gamma-ray spectroscopy of light hypernuclei)

The E63 experiment aims to carry out precision gamma-ray spectroscopy of the ${}^{4}_{\mathrm{H}}\Lambda$ (1→0) transition by employing the reaction ${}^{7}\mathrm{Li}(K^-, \pi^-)$. The aim is to improve our understanding of the charge-symmetry-breaking effect observed in previous experiments by comparing the ${}^{4}_{\Lambda}\mathrm{H}$ and ${}^{4}_{\Lambda}\mathrm{He}$ transitions. A large difference (∼0.3 - 0.4 MeV) was observed in the two transitions and the most precise measurement carried out at the MAMI facility currently retains a precision of 7 keV. The aim of E63 is to reach a precision of $<$5 keV to better understand this effect, which is key to unravel the details of baryon-baryon interactions including strangeness.

The PAC congratulates the collaboration for the successful commissioning of the S-2S spectrometer and for demonstrating a satisfactory momentum resolution for the π^- detection to be used in coincidence with the gamma-ray detection. The measured improved K^- beam intensity and more realistic simulations now allows for a realistic estimate of the beam time request.

The E63 collaboration also presented a revised plan to conduct the experiment at K1.8 with the S-2S setup, and estimated that the Hyperball-J system can be installed in three months. The PAC finds this estimate reasonable. The costs of the installation are guaranteed by the experimental group. The PAC supports this plan.

The PAC also supports the allocation of the leftover 12 hours of test beam, and 17 days of physics beam time (12 days for production and 5 days for commissioning).

5.6 E73 (hypertriton lifetime)

The experiment E73 aims to perform a direct measurement of the hypertriton lifetime by producing ${}^{3}_{\Lambda}$H by the ^{3}He$(K^-,\pi^0){}^{3}_{\Lambda}$H reaction, and by detecting the forward emitted π^0 to tag the hypertriton formation and the π^- emitted from the hypertriton weak decay. The method was demonstrated by the measurement of the ${}^{4}_{\Lambda}$H lifetime with a global precision of 14 ps and these results have already been published.

The PAC congratulates the collaboration for the demonstrated proof of concept of the direct measurement of the hypertriton lifetime by means of the exclusive reaction. The 11.5 days of beam acquired in 2024 before the summer allowed the collaboration to measure the reaction cross section of ^{3}He$(K^-,\pi^0){}^{3}_{\Lambda}$H and also demonstrated that the selection of the charged pion works in the same way as for the ${}^{4}_{\Lambda}$H case.

The collaboration has estimated a global precision of 28 ps for the extraction of the hypetritron lifetime, assuming that the remaining 13.5 days of data taking are granted. The PAC comments on the necessity of carrying out systematic studies for different background models for the quasi-free hyperon production for the hypertriton lifetime, because for this channel, the signal to background ratio is much smaller than in the ${}^{4}_{\Lambda}$H case. It is also suggested to employ a simultaneous fit of the ${}^{4}_{\Lambda}$H and ${}^{3}_{\Lambda}$H data to better constrain the contribution of the quasi-free background.

The PAC recommends the allocation of 2.5 additional days for test, and the remaining 13.5 days of the approved beam time before the summer.

5.7 E72 (Λ^* resonance)

E72 will measure the angular distributions and Lambda polarization in the $Kp \to \Lambda\eta$ reaction using the Hyperon Spectrometer with HypTPC at the K1.8BR beam line. It aims to establish the existence of a narrow Λ^* resonance with J=3/2 and to determine its parity. The quark model does not predict this resonance state; it might be described as an exotic hadronic state, such as a penta-quark baryon or hadron molecule.

The proponents presented readiness for the experiment. Analysis of E42, of which many parts are common to E72, is progressing well. The performance of HypTPC was demonstrated with the new analysis code. The target system is ready to be moved to J-PARC. The modification work for the HypTPC has been done successfully for a target holder and a new gas vessel. The gas tightness was confirmed to be sufficient. In addition, Cherenkov counters, namely Kaon Veto Cherenkov counter (KVC) and Beam Aerogel Cherenkov Counter (BAC), have been tested using electron beams at the KEK-AR test beam line. The test results indicated that these counters are ready for the experiment. Beam profile and intensity at K1.8BR beam line have been rechecked.

PAC congratulates E72 on their thorough preparation for the experiment and recommends allocating 4 hours of beam time in JFY 2024 to test trigger counters. After changing the detectors from the current Cylindrical Detector System (CDS) to the Hyperon Spectrometer, PAC will endorse their request of six days of commissioning/calibration run and eight days of physics run at 80 kW in JFY 2025.

5.8 P104 (Double ϕ production)

Deferred

P104 proposes a cross section measurement for $p\bar{p} \to \phi\phi$ production at energies near the production threshold. The previous results, reported by the JETSET experiment at LEAR in 1994-1998, showed that the cross sections at around 2.2 GeV CM energy were about two orders of magnitude higher than that expected from the OZI rule. The experiment aims eventually to pin down the production mechanism alternative to the OZI-suppressed two-gluon emission. As the first part of the experiment, the proponents propose an energy scan for CM energies between the threshold and 2.15 GeV to provide the first cross section measurements in the region unexplored so far. The experiment utilizes the same detector as that for E72 at K1.8BR but with $\bar{p}$ beam and with a different trigger condition. P104 requests 6.5 days of beam time; no switching time from E72 was requested as it was considered to be negligible.

The PAC noted that the K1.8BR area may be rearranged for the E80 experiment in 4Q JFY 2025 after the E72 experiment, although the plan is subject to the final approval. The PAC considers this proposal as that for a physics experiment, not for a test experiment as implied in the proposal, since it aims for physics results with significant running time.

The PAC finds the measurement for this channel unique, and considers these proposals utilizing $\bar{p}$ beam will extend the physics potential of the facility. Questions were raised, however, if the potential of the data taken in the 6.5 day running is fully explored. Most notably, the PAC considers that the sensitivity study of any partial-wave type analysis should be made; namely, angular distribution analysis of the produced ϕ mesons and polarization study through K-meson angles, even with the limited statistics of about 1500 events. The scenario for the energy scan should also be justified by its physics motivation. For example, it was not clear why the threshold scan is more important than collecting events at the energies overlapping with the JETSET measurement at around 2.15 GeV, corresponding to the highest available energy at K1.8BR and closest to the peak structure above

2.2 GeV, which is of most interest. Questions were also raised on trigger and reconstruction efficiencies, as a function of the decay angles, in particular.

Summarizing, the PAC finds that the motivation of the proposed measurement should be reinforced, by demonstrating that the experiment is capable of revealing the underlying mechanism of the anomalously large production cross sections reported in the past. The PAC, therefore, suggests the proponents to update the proposal document so that it contains quantitative sensitivity studies on the angular analysis, feasibility of the trigger scheme, and optimized strategy for the CM energies to take data. Such an update aiming for the Stage-1 status should be submitted to the next-winter PAC meeting, to leave a possibility of recommending the Statge-2 approval at the PAC meeting in summer 2025, because the current K1.8BR beam line configuration and the E72 detector setting may not be available until the end of JFY 2025.

5.9 E80 (Light kaonic nuclei)

Recommend Stage-2 Approval

E80 aims to study the nuclei $K^{-}ppn$, produced by impinging K^{-} beam on ^{4}He target at K1.8BR beam line. Decay particles from kaonic nuclei are to be measured using a new cylindrical detector system (CDS). This proposal was given a Stage-1 status in 2021.

In January 2024, the PAC recommended E80 to submit an updated TDR in accordance with the comments by FIFC for receiving the Stage-2 approval. In this 38th PAC meeting, the FIFC reported the review of the revised TDR which includes the descriptions of the superconducting magnet, structural analysis of the CDS, the supporting structure of the CNC, and the radiation level of the modified K1.8BR beam line.

The FIFC concludes that the concerns for the detector design and construction plan have been resolved technically and financially. E80 proponent reported their preparation status and requested the Stage-2 approval and endorsement of the upgrade of the K1.8BR beam line.

The PAC appreciates the FIFC's careful review of the E80 TDR. Based on the FIFC's report and E80's status report, the PAC recommends Stage-2 approval for E80. Also, the PAC expects E80 to be performed with the upgraded K1.8BR beam line. The PAC recommends E80 and the facility side have detailed discussions on the plan to modify the K1.8BR beam line, including timeline and budget.

5.10 T98 (LArTPC)

The purpose of the T98 experiment is to investigate antimatter interactions using a Liquid Argon Time Projection Chamber (LArTPC). During Phase-1, completed in June 2023, the focus was on measuring antideuteron flux at the K1.8BR beam line. While beam data was successfully collected, significant antideuteron signal candidates were not detected. Consequently, the team proposed Phase-2, which centers exclusively on antiproton capture, requesting 24 hours of beam time. This proposal received recommendation for an approval at the 37th PAC meeting.

Extensive preparations have been undertaken, including comprehensive detector tests at Waseda University, achieving a week of stable operation. The data acquisition system has been upgraded to read out 128 channels of charge signal from LArTPC, 5 channels for a PMT and MPPCs, and 1 channel for event tagging. The detector system, including the LArTPC, is ready to be transported to the J-PARC facility during the summer shutdown. Significant progress has also been made in preparing the K1.8BR site, including the construction of a cryostat stand and implementation of safety measures for handling liquid and gaseous argon, following the safety standards of Hadron Experimental Facility.

The PAC commends the T98 collaboration for their significant progress and acknowledges that the findings from Phase-2, utilizing a highly pure antiproton beam, will be crucial for advancing their GRAMS project. This includes the pGRAMS phase, which features a NASA-approved balloon flight scheduled for mid-2025 to 2026. The PAC reaffirms the approval of the beam time and recommends proceeding with the scheduled beam time allocation (to be completed before JFY 2025). Additionally, PAC advises the development of an event selection procedure to effectively distinguish antiproton events from proton and deuteron events.

5.11 P95 (ϕ Production)

Deferred

P95 proposes to study ϕ meson production in $\pi^- p$ collisions using the modified E16 setup. The PAC appreciates the proponents' effort to answer questions raised in the past PAC meetings. In this meeting, the PAC pointed out that not only the possible bump in the ϕn final state but also relevant coupled-channel contributions such as $K^{0(*)}\Lambda$ and $K^{0(*)}\Sigma^{0(*)}$ channels should be studied to understand the results even if the bump is observed. Because those coupled-channels have neutral daughter particles, PAC asks the proponents to demonstrate that they can reconstruct those decays, by using Monte Carlo simulation data.

In addition, because the experiment needs a high momentum π^- beam, PAC would like to hear an overall optimized plan to run experiments on the B-line considering the P93 studies to evaluate the performance of the secondary beam mode at B-line.

5.12 P99 (Epithermal neutrons)

Recommend Stage-1 Status for Phase-I

P99 aims to study time-reversal invariance violation (TRIV) using an epithermal neutron beam. TRIV, equivalent to CP violation, serves as an important clue for searching for new physics beyond the standard model of elementary particles.

The proponents propose to measure the forward scattering amplitude of polarized neutrons from polarized ^{139}La nuclei, in which TRIV is strongly enhanced by a p-wave resonance at 0.75 eV. By flipping the spin of the incident neutron, spin asymmetry of the scattering amplitudes will determine the ratio of the TRIV to parity violating (PV) amplitudes, both of which would be enhanced by the resonance energy. A measured asymmetry will be sensitive to a new effective TRIV coupling between pions and nucleons. This method thus provides a new type of TRIV data complimentary to the EDM measurements.

The proponents plan to carry out the experiment in two phases, Phase-I with a low-intensity beam and a small target, and Phase-II with a higher-intensity beam and a large target facilitated by an advanced neutron detector. The Phase-I experiment will be carried out at the existing BL10, BL22 or BL04 beam line at the MLF facility.

The PAC congratulates the proponents for bringing a novel idea and making careful planning and development for the new-type of TRIV experiment. The PAC recognizes the physics merit and significance of the proposed experiment highly. Following the recommendation given at the previous PAC meeting, an External Panel for technical feasibility was held and gave an oral report at this PAC meeting. (A written report will be submitted later.) The Panel strongly supports the staging plan in properly understanding possible systematic errors in advance before the full measurement is scheduled. The Panel has checked the feasibility of the Phase-I set up and concluded that all the experimental components are ready for the Stage-1 status. The Panel pointed out that while the asymmetry measurement may avoid most of possible systematic errors, there remain some systematic errors, such as effects of small angle scatterings, Bragg reflection, non-uniformity of materials for the neutron, that are not well understood nor controlled. Thus, the Panel concluded that the Phase-I measurement is necessary to understand the systematic errors, so that the Phase-II should be considered after the Phase-I data are analyzed.

The PAC agrees with the Panel's evaluation and conclusion. The PAC recommends granting Stage-1 status to Phase-I of the proposed experiment at this time. However, the PAC advises that consideration of Phase-II should be contingent upon the findings of the analysis of Phase-I data to better understand and control systematic errors.

5.13 P100 (Pulsed cold neutrons)

Recommend Stage-1 Status

P100 proposes to measure the neutron lifetime at the MLF BL05 beam line using the beam method to a precision of 1 second. The neutron lifetime is a fundamental quantity that impacts areas of nuclear physics, particle physics, and cosmology. There are two leading methods to measure the neutron lifetime; one observes the neutrons decay-in-flight (i.e., the beam method), and the other measures the exponential decay of neutrons trapped in a bottle (i.e., the bottle method). The two methods give neutron lifetimes that differ by about 9.5 seconds (4.6σ). This discrepancy is known as the "neutron lifetime puzzle". It is still an open question whether the existing discrepancies and partly conflicting results are due to some unidentified systematic errors or if they indeed indicate new physics beyond the standard model.

PAC reviewed the revised proposal and recent progress presented at the meeting on the understanding and reduction of systematic errors for the experiment by addressing the suggestions by PAC. Although the proposal is not as detailed as standard J-PARC proposals, PAC appreciates the P100 collaboration for their efforts for the careful preparation and optimization of the experiment. The PAC recognizes the scientific merit and impact of the experiment and also understands that achieving the measurement with the precision of 1 second is an extremely challenging task. PAC recognizes the special demands on this high-precision experiment and considers it as an important step towards identifying all possible sources of systematic errors hidden in the complexity of the experimental setup.

Significant improvements are still needed for understanding and reducing various systematic errors including background sources, discrepancies between observations and Monte Carlo simulations, validation of pile-up correction, *etc.* PAC recommends the Stage-1 status for P100 to allow the collaboration to collect data to perform more extensive studies on detailed systematics that may not be otherwise controlled and understood.

The PAC emphasizes that with the Stage-1 status, proponents should continue their efforts in investigating and reducing any potential systematic errors to achieve the precision of 1-sec measurement, and clearly document all the findings in their Technical Design Report (TDR) before the Stage-2 approval.

The PAC congratulates all the efforts of the P100 collaboration, and eagerly awaits for significant improvements in understanding systematics and a well-documented TDR required for receiving the Stage-2 approval.

5.14 E14 (KOTO)

The KOTO experiment (E14) searches for the rare CP-violating decays $K_L \to \pi^0 \nu\bar{\nu}$ in the J-PARC neutral beam line. The decay rate is precisely predicted and thus provides an excellent probe for physics beyond the standard model. KOTO recently presented a limit on the branching fraction of 2×10^{-9} at the 90% C.L. from their 2021 run based on the observation of zero signal candidates upon an estimated background of $0.255 \pm 0.058(\mathrm{stat})^{+0.053}_{-0.068}(\mathrm{syst})$ events.

At this meeting, KOTO reported the finalization of the 2021 data analysis towards publication of their preliminary result. A data driven evaluation and correction procedure has been developed for the background arising from $K_L \to 2\pi^0$, using a control sample of $K_L \to 3\pi^0$ with 5 photons detected in which the sixth's photon kinematics can be used to measure the veto inefficiency. The paper will soon be submitted. A larger data sample of 5 γ's is essential to improve the statistical uncertainty on the corrections in the future. Analyses of $K_L \to \gamma\overline{\gamma}$ ($\overline{\gamma}$: dark photon) and $K_L \to \pi^0 4e$ were also performed on the data taken with special triggers in 2020 and 2021, respectively, and the results were presented at ICHEP2024.

KOTO also presented their progress on the setup and data taken in 2023 and 2024. The Upstream Charged Veto (UCV) was redesigned, achieving reduced material budget, improved signal/noise ratio, more radiation tolerance, and importantly a significant improvement in efficiency (from 8% inefficiency to less than 1% inefficiency based on in-situ evaluations). Besides, a second permanent magnet (D2) with an average field strength of 0.87 T was added in 2023 to the beam line, just upstream of the KOTO detector. The last part of the second collimator was modified to make it compatible with D2. The addition of D2 allows a factor of 10 reduction in the background caused by charged-kaon decays. The modification of the last collimator causes a 30% increase of the halo K_L as expected, but is compensated by the effect of the improved UCV. The other leading background arising from upstream π^0's can be studied using a special run with an Al target inserted in the K_L beam. The DAQ was substantially improved in 2024, modifying the event building and High Level Trigger (HLT) strategy, allowing the collection of a 5-γ sample about 9 times larger than in 2021.

KOTO received beam in April-June 2024 at >80 kW intensity with a higher repetition of 4.24 sec (from 5.2 sec). Unfortunately, the beam structure was not improved with respect to 2021, after the Main Ring power supplies upgrade. The beam structure has a direct and significant impact on accidental losses, which, in turn, affects acceptance. Currently, this impact negates any improvements in beam power. Additionally, the data-taking period was significantly shorter than planned – less than half of the expected duration due to Main Ring down time.

KOTO stresses the necessity of improving the spill quality, and requests 2 months at >80 kW beam in the latter half of JFY 2024. There is also a standing request of >3 months per year with $>$ 80 kW beam power.

The PAC commends KOTO on the foreseen publication of the 2021 analysis, and on the continuing evolution of their analysis methodology and techniques that result in a steady improvement of the limit on the branching fraction. This improves the prominence of rare kaon physics in the world flavor community and bodes well for KOTO and its evolutions in the future.

PAC recognizes that an improved spill structure is the key to success for KOTO, and recommends that every effort should be made to improve the beam spill quality. The PAC recommends that KOTO has regular beam time so that they can continue their stepwise improvements in sensitivity.

5.15 E34 ($g-2$/EDM)

E34 aims to perform precise measurements of the anomalous magnetic moment and electric dipole moment of the muon at the J-PARC MLF H-line, using a novel technique that utilizes a cold surface-muon beam, muon acceleration, and injection into a compact storage magnet. The proposed method differs from the magic-gamma type of measurements (BNL and FNAL) and provides an opportunity to measure muon $g-2$ with different systematic effects.

The PAC congratulates E34 on successfully demonstrating the world's first cooling and acceleration of muons, a major milestone in JFY 2024. The surface muons are stopped in the silica aerogel and then combined with electrons to form muoniums. The muoniums are ionized using 244-nm laser light with two-photon excitation to produce thermal muons of 30 meV. Immediately after the ionization, the muons are accelerated up to 99 keV. The time-of-flight of the muons was clearly detected using the MCP at the correct timing.

The PAC acknowledges the E34 collaboration's work on other promised milestones for this fiscal year. Funding is secured for the extension of the muon accelerator at H2 to obtain 4-MeV muons. Beam injection into the storage magnet is ongoing using an electron beam, with the first observation of stored electron signals and the completion of data acquisition. The positron-tracking detector is being developed on schedule, and data analysis software preparation is in progress. The E34 collaboration is addressing comments from the IPNS Progress Review Committee. E34 is making significant efforts to strengthen their manpower.

The PAC acknowledges the many advances made by E34 since the last meeting, and looks forward to an updated report.

5.16 E11/E65 (T2K)

The T2K experiment is a long-baseline neutrino experiment which utilizes a high-power neutrino beam and a combination of a near detector suite at J-PARC and the Super-Kamiokande detector in Kamioka in order to over-constrain three-neutrino oscillations and search for CP violation in neutrinos.

The committee congratulates the T2K collaboration on impressive progress on both beam and ND280 upgrades. On the beam front, despite significant downtimes in February 2024 due to a helium compressor failure (mitigated starting June 2024) and in June 2024 due to cooling issues, the collaboration has successfully completed beam line upgrades and achieved stable operation at 800 kW with 320 kA of horn current, which represents the highest J-PARC MR and Neutrino beam power ever achieved. Reaching this milestone provides further confidence that the beam line equipment can be operated without issues, and that the upgrade plan to 1.3 MW is feasible. On the detector front, the ND280 detector upgrade installation was completed in May 2024, and first neutrino data with the upgrade was taken in June 2024, with a data taking efficiency of 96.1%. The near-detector upgrade provides larger angle acceptance and improved proton detection thresholds.

The committee also congratulates the T2K collaboration on the suite of new results over the past 6 months that make use of already-collected data, namely the joint T2K+NOvA analysis results announced in February 2024, and new T2K+SuperK results announced in June 2024, which are still consistent with large CP violation. In the inverted ordering, the T2K+NOvA combination finds CP conserving values of δ_{CP}outside the 3σ interval allowed by the fit; in the normal ordering, a wider range of δ_{CP}values are allowed given the different favored regions of the two experiments. The joint fit does not strongly favor either mass ordering. The committee encourages the collaboration to continue working with NOvA to quantify the mild tension apparent under the normal ordering assumption. The committee encourages the collaboration to continue working with NOvA to quantify the apparent tension. The committee was pleased to hear that the collaboration is working on sensitivity optimization studies considering varying proportions of neutrino vs. antineutrino running in the future, and encourages the collaboration to continue sensitivity optimization studies considering also the impact on the joint T2K+NOvA search as well. The T2K and NOvA collaborations already plan to discuss plans for the next joint fit in an upcoming workshop. The committee also commends the collaboration for initiating joint working group meetings with the NINJA experiment, and encourages them to continue their joint efforts with NINJA toward published physics analyses utilizing NINJA constraints.

The committee appreciates the amount of efforts and studies being put into mitigating and understanding the effect of faulty geomagnetic field compensating coils (GCCs) in the SuperK detector. The GCC failures were caused by corrosion during Gd running, and affect data taking in late 2023, amounting to ∼20% of the total data in neutrino-enhanced beam (FHC). This is a concerning development that was first reported at the 37th PAC meeting. The collaboration has since initiated a comprehensive response effort, including the installation of new GCCs in SuperK where physically possible, and the launch of data and simulation studies to understand and mitigate the impact of the geomagnetic field on reconstruction and selection efficiencies. Due to the large size of PMTs employed by SuperK, geomagnetic field effects can affect their collection efficiency significantly and calibration studies in progress suggest a 10%-15% degradation. This results in at most a 10% loss of efficiency to accept beam neutrinos, which might be recovered by retuning the reconstruction. The committee encourages the collaboration to consider additional solutions to compensate for the magnetic field effects.

The collaboration is continuing to grow, with an increasing number of students, and a healthy stream of publications, both signs of a healthy experimental collaboration.

The collaboration is ready to resume beam operations in November 2024, and aims to collect data corresponding to a total beam delivery of 1×10^{22} POT by the time that HyperK starts, which would double the current statistics. Note, however, that current projections assuming 4 months of beam delivery per JFY would bring the total to 20% short of 1×10^{22} POT, at 0.8×10^{22} POT, primarily due to shortfalls during 2022-2023. The committee supports the T2K beam requests and recommends that T2K receive as close as possible to 110 days of beam over the next 12 months, consistent with their request at this meeting, and consistent with the 2020 KEK DG's statement. We look forward to hearing more from the collaboration in early 2025, including progress toward realizing the beam upgrade to 1.3 MW in parallel with stable operations, and progress on mitigating the impact on the analysis of the data collected during failed GCC operation.

5.17 E56/E82 (JSNS2, JSNS2-II)

E56(JSNS2)/E82(JSNS2-II) experiment is searching for neutrino oscillations caused by a sterile neutrino at short baseline using the liquid scintillator detector(s) located near the J-PARC MLF. This serves as a unique and important, direct test of the long-standing LSND anomaly. The PAC appreciates the collaboration's effort to come up with the updated $^{12}C(\nu_e, e)^{12}N$ and Kaon-Decay-at-Rest (KDAR) neutrino analysis results. PAC recognizes that three papers were submitted describing background study and data processing/reconstruction for journal publication. The muon production target for MLF has been identified as a background source. A possibility to add a proper shield is being considered, and PAC encourages such an attempt. As for the second detector fabrication, the PAC congratulates the significant progress made since the last PAC meeting, and looks forward to seeing the collaboration solve various issues including funding problems toward completion of construction. PAC looks forward to a steady progress in the analysis. Reinforcing analysis activity or recruiting new collaborators might be needed. The PAC also would like to hear the status of the integration of Michigan's DAQ electronics at the next PAC meeting.

5.18 E71 (NINJA)

The NINJA experiment focuses on measuring differential cross sections of charged-current neutrino interactions to reduce systematic uncertainties in neutrino oscillation measurements. Utilizing emulsion technology, the experiment can detect low-energy secondary particles with detailed particle identification.

Since the last update, the NINJA collaboration has made notable strides. They completed physics run E71a, collecting 4.8×10^{20} POT and presenting preliminary results with 770 ν_μ charged-current events on water. The second run (E71b), conducted from November 2023 to February 2024, achieved 93% effective neutrino beam exposure, totaling 2.9×10^{20} POT. Emulsion film development was flawless, and a new scanning system is ready for data analysis. The team is now preparing for the next phase, physics run E71c, with a goal of achieving a total of 1.0×10^{21} POT across the entire E71 series. New scintillator tracker and large emulsion shifter are planned.

The PAC commends the NINJA collaboration for its continued progress in advancing the understanding of low-energy neutrino interactions, particularly through ongoing data analysis and preparation for future runs. The PAC encourages the collaboration to increase the publication of their results and eagerly anticipates the outcomes from the T2K-NINJA joint working group, which seeks to integrate NINJA's findings into the T2K neutrino oscillation analysis. Additionally, the PAC looks forward to hearing new proposals from NINJA to further advance their research.

5.19 E83 (SUBMET)

E83 aims to search for low-mass milli-charged particles that are theorized in dark-sector models that extend beyond the Standard Model. The experiment is designed to observe the milli-charged particles that can be produced by protons hitting the target for T2K. The E83 experiment has already received Stage-2 approval at the 35th PAC meeting.

As required by the FIFC report, the complete detector assembly and full system test were performed at Korea University before being shipped to J-PARC. The E83 experiment started operation in June 2024.

The PAC congratulates the collaboration on the successful initial operation. At the next PAC meeting, PAC looks forward to hearing early analysis results, to assess the progress toward the nominal target POT of 5×10^{21}.

5.20 E21 (COMET)

The COMET experiment is designed to search for a muon converting into an electron without emitting any neutrino inside an aluminum target at a new beam line (C-line) in the Hadron Experimental Facility. The original strategy involves two phases: Phase-I, targeting a conversion rate of 10^{-14} with beam power of 3.2 kW, and Phase-II, aiming for the rate of less than 10^{-16} with 56 kW. The Phase I has received Stage-2 approval.

Progresses in COMET were reported at this PAC meeting. The COMET management structure has been restructured towards the detector integration for physics run. Progresses were presented about the preparation of the beam line, the radiation shield design and procurement, the cryogenic system, detector and DAQ, and the magnet system.

To ensure collection of some data as soon as possible, the collaboration proposes reducing the initial beam power and using less shielding to reduce cost. Specifically, COMET proposes to initially run Phase-1 at low intensity (Phase1 LI) with far less iron ceiling shield. Phase-1 LI would reach a SES of 3×10^{-13} (comparable to SINDRUM-II) in about 1 cycle in 2026. Then Phase-1 would reach a SES of 3×10^{-15} (that is comparable to that of the competitor experiment Mu2e at Fermilab in its 2027 Run1) in about 150 days of 8-GeV MR from 2028.

The pion capture solenoids (PCS) is progressing without sizable delay; the detector solenoids (DS) is ready; the bridge solenoid (BS) will complete the tests by 2025. The Review committee described below recommended to reduce the PCS peak field from the designed 4.9 T to 4 T to improve the safety margin with a loss of 10% muon yield. The critical item is the time to install target and collimator shields in 2026 (limited by material procurement). The CDC is already ready. The Cylindrical Trigger Hodoscope (CTH) is being produced. On the detector side, the critical item is the Cosmic Ray Veto (CRV) of which the top side will be ready by 2027, still giving important information on the experiment sensitivity.

A Review committee for COMET, commissioned by PAC, was held in July 2024. The review assessed the scientific significance, the soundness of the technical aspect of the experiment, and the management and leadership aspects of the collaboration, in light of the non-negligible funding still required to realize the experiment. Preliminary findings were presented to the PAC. The review highlights strong theoretical support for the search for charged-lepton flavour violation. The preliminary Report has several recommendations, in particular:

1. taking data as soon as possible at low intensity (Phase-1 LI) is paramount

to identify possible issues and solve them promptly;

2. the collaboration and the laboratory should continue to work together to ensure that the necessary funding is secured for the realization of Phase-1 LI as soon as possible, since, given the Mu2e competition, the success window is narrow;

3. the collaboration and the laboratory should continue the technical discussion about the operation conditions to reach the optimal conditions;

4. full funding for the CRV, especially for the top veto which will be used in Phase-1 LI, should be secured as soon as possible since this detector is instrumental to suppress the cosmic ray background.

The final Report will be ready soon, and these recommendations may evolve in the final version. PAC would like to thank the review committee chaired by Augusto Cecucci for their thorough review.

The PAC congratulates the collaboration on the progress made, acknowledging all the efforts and dedicated studies in overcoming challenges.

The PAC agrees that taking data at a reduced intensity in Phase-1 LI as early as possible is the correct strategy at this point. Subsequent COMET Phases will be discussed in future PAC meetings. The PAC also agrees with the Review recommendations as specified above, in particular that the collaboration and the laboratory should continue to work together to ensure that the necessary funding for Phase-1 LI is quickly secured. The PAC encourages COMET to continue their efforts towards the timely realization of Phase-1 LI.

6 General Remarks and Recommendations

The PAC congratulates the IPNS and J-PARC on their excellent and diverse physics program, spanning both hadron and lepton physics, and the numerous achievements of the experiments conducted here. The PAC also commend the steady improvements at the J-PARC facility, including the successful and stable 800-kW operation of MR, the 80-kW slow extraction, and the world's first muon acceleration.

However, for the continued stable operation of J-PARC, it is crucial to prioritize the replacement of aging equipment. The PAC recommends that management develop a financial plan to address this issue, ensuring sufficient provision of spare elements.

The PAC recognizes that the spill structure significantly impacts the efficiency of many experiments. It is essential for the accelerator and experimental groups to collaborate closely to mitigate this problem, including utilizing experimental detectors to aid in diagnosing the beam spill structure.

The existing vibrant and varied physics program at the Hadron Experimental Facility (HD) bodes well for the Hadron Hall Extension plan. The inclusion of antiproton and pion beams will make it a unique and comprehensive facility on a global scale. J-PARC will soon become the only facility in the world where precision kaon experiments can take place, following CERN's decision to end its kaon program by LHC Long Shutdown 3, despite the program's high rating by the CERN Scientific Committee (SPSC) and Research Board.

The long shutdowns of the CERN accelerator complex between LHC operations have increased the global community's demand for a test beam line in HD. The availability of this facility in time for CERN's Long Shutdown 3 would provide a significant opportunity to attract international users to J-PARC.

PAC has reviewed the beam time plan to compensate for the loss of beam time in 2024 and to meet experimental demands as efficiently as possible. The plan is to have November-December 2024 for Fast Extraction programs aiming MR baking, and January-February 2025 for Slow Extraction programs. Detailed allocation will be updated in January 2025. The PAC fully endorses this plan.

Lastly, the PAC Chair would like to express deep appreciation to Motoi Endo, Takahiro Kawabata, Hiroaki Ohnishi, Kohei Yorita, Patrick Achenbach, Laura Fields, David Jaff, and Kam-Biu Luk for their long dedicated contributions to the Committee.

7 Dates for the Next J-PARC PAC Meeting

The next J-PARC PAC meeting will be held around early January, 2025.

8 Documents Received

For this meeting, the J-PARC received the following documents.

- Minutes of the 37th J-PARC PAC meeting held on 24-26 January 2024 (KEK/J-PARC-PAC 2024-5)
- Proposals:
  - Proposal for a test experiment to evaluate the performance of the trigger-less data-streaming type data acquisition system (KEK/J-PARC-PAC 2024-6)
  - Double ϕ Production in $\bar{p}p$ Reactions near Threshold (KEK/J-PARC-PAC 2024-11)
  - Neutron lifetime measurement with pulsed cold neutrons (KEK/J-PARC-PAC 2024-13)
- Technical Design Report:
  - Technical Design Report on the E80 Experiment: Systematic investigation of the light kaonic nuclei (2024 revised version) (KEK/J-PARC-PAC 2024-7)

- Letters of Intent:
  - Investigating $\bar{d} + {}^{12}\mathrm{C}$ nucleus interaction at J-PARC (KEK/J-PARC-PAC 2024-8)
  - Search for the Θ^+ in $K^+d \rightarrow K^0pp$ Reaction with Hyperon Spectrometer (KEK/J-PARC-PAC 2024-10)
- Reports:
  - Pion-induced phi-meson production on the proton (addendum 3) (KEK/J-PARC-PAC 2024-9)
  - P100: Response to questions in PAC37 (KEK/J-PARC-PAC 2024-12)
  - E75: Report on the E75 Phase-1 experiment (KEK/J-PARC-PAC 2024-14)